

WHAT IS CLAIMED IS:

1                   1.       A pressure-assisted breathing system comprising:  
2                   a pressure-generating circuit for maintaining a positive pressure within the  
3 system;  
4                   a patient interface device coupled to a patient's respiratory system;  
5                   a respiratory circuit for providing gas communication between the pressure-  
6 generating circuit and the patient interface device; and  
7                   a nebulizer coupled to the respiratory circuit.

1                   2.       A system according to claim 1 wherein the pressure-generating circuit  
2 comprises a conduit that couples a flow generator with a pressure-regulating device.

1                   3.       A system according to claim 1 wherein the pressure-generating circuit  
2 comprises a first flexible tube and the respiratory circuit comprises a second flexible tube,  
3 and wherein the second flexible tube has a smaller diameter than the first flexible tube.

1                   4.       A system according to claim 3 wherein the second flexible tube is a  
2 silicone tube having an outside diameter of 5 mm or less.

1                   5.       A system according to claim 1 wherein the nebulizer comprises a  
2 reservoir for holding a liquid medicament to be delivered to the patient's respiratory system,  
3 a vibrating aperture-type aerosol generator for aerosolizing the liquid medicament and a  
4 connector for connecting the nebulizer to the respiratory circuit so as to entrain the  
5 aerosolized medicament from the aerosol generator into the gas flowing through the  
6 respiratory circuit.

1                   6       A system according to claim 5 wherein the reservoir has a capacity  
2 equal to one unit dose of medicament.

1                   7.       A system according to claim 6 wherein the reservoir has a capacity of  
2 4 ml or less.

1                   8.       A system according to claim 5 wherein the nebulizer has a net weight  
2 of 5 gms or less.

1                   9.       A system according to claim 8 wherein the nebulizer produces 5  
2   decibels or less of sound pressure.

1                   10.     A system according to claim 5 wherein the aerosol generator has a  
2   weight of about 1 gm.

1                   11.     A system according to claim 1 wherein the nebulizer is located in the  
2   direct vicinity of the patient's nose, mouth or artificial airway.

1                   12.     A system according to claim 11 wherein the respiratory circuit  
2   comprises a gas conduit contained within the patient interface device and the nebulizer is  
3   integrated with the patient interface device

1                   13.     A system according to claim 1 wherein the patient interface device  
2   comprises nasal prongs, a mask, nasopharyngeal prongs, a nasopharyngeal tube, a  
3   tracheotomy tube or an endotracheal tube.

1                   14.     Apparatus for the delivery of an aerosolized medicament to a patient  
2   comprising:

3                   a first gas conduit connecting a gas flow generator to a pressure-regulating  
4   device to provide a first high-volume gas flow for generating a continuous positive airway  
5   pressure;

6                   a patient interface device coupled to a patient's respiratory system;

7                   a second gas conduit connecting the first gas conduit to the patient interface  
8   device for providing a second gas flow to the patient's respiratory system that is lower  
9   volume than the first gas flow; and

10                  a nebulizer coupled to the second gas conduit for emitting an aerosolized  
11   medicament into the second gas flow.

1                   15.     Apparatus according to claim 14 wherein the second gas conduit has  
2   an outside diameter less than the first gas conduit.

1                   16.     Apparatus according to claim 15 wherein the second gas conduit is a  
2   flexible silicone tube having an outside diameter less than 5 mm.

1                   17.     Apparatus according to claim 14 wherein the nebulizer has a net  
2   weight less than 5 gm and produces less than 5 decibels of sound pressure..

1                   18.     Apparatus according to claim 17 wherein the nebulizer comprises a  
2 reservoir having a capacity equal to one unit dose of medicament..

1                   19.     A CPAP device comprising:  
2                   a source of pressurized gas;  
3                   a mask coupled to the respiratory system of a patient;  
4                   a flexible tube connecting the source of pressurized gas to the mask; and  
5                   a nebulizer coupled to the mask and adapted to emit aerosolized medicament  
6 in close proximity to the patient's nose and/or mouth.

1                   20.     A method of respiratory therapy comprising the steps of:  
2                   providing a pressure-assisted breathing system having a pressure-generating  
3 circuit and a respiratory circuit coupled to a patient interface device, the pressure-generating  
4 circuit having a higher volume flow of gas than the respiratory circuit; and  
5                   introducing an aerosolized medicament only into the flow of gas in the  
6 respiratory circuit to deliver the medicament to the patient's respiratory system.

1                   21.     A method according to claim 20 wherein the aerosolized medicament  
2 is introduced by a vibrating aperture-type nebulizer coupled to the respiratory circuit.

1                   22.     A method according to claim 21 wherein the nebulizer comprises a  
2 reservoir having a capacity equal to one unit dose of medicament and substantially all of the  
3 contents of the reservoir is delivered to the patient's respiratory system without the need to  
4 replenish the reservoir.

1                   23.     A method according to claim 22 wherein the dose is 4 ml or less of  
2 medicament.

1                   24.     A method of delivering a surfactant medicament to a patient's  
2 respiratory system which comprises the steps of :  
3                   providing a pressure-assisted breathing system having a pressure-  
4 generating circuit, a respiratory circuit coupled to a patient interface device and a vibrating  
5 aperture-type nebulizer coupled to the respiratory circuit;  
6                   introducing a liquid surfactant into the nebulizer;  
7                   aerosolizing the surfactant in the nebulizer ; and  
8                   entraining the aerosolized surfactant into the respiratory circuit,  
9 whereby the patient breathes the aerosolized surfactant through the patient interface device.

- 1                    25.    The method of claim 24 wherein the surfactant is a phospholipid.
- 1                    26.    The method of claim 24 wherein 6-18% of the aerosolized surfactant is
- 2 delivered to the patient.
- 1                    27.    The method of claim 24 wherein one unit dose of medicament is
- 2 introduced into the nebulizer and the entire dose is delivered to the patient.
- 1                    28.    The method of claim 24 wherein the dose is equal to 10 mg or less of
- 2 surfactant.